

Listing of Claims

The following listing of claims is intended to supercede all previously filed listings of claims. Changes are shown with deletions in ~~striketrough~~ and additions underlined.

Kindly enter the following amendments to the claims:

Claim 1 (Previously Amended). A system for detecting a light signal relating to the vibration of a target object, including:

an array of light amplitude modulation detectors, each detector in the array configured to receive a light signal from a corresponding region of the target object and to generate an output representing the received signal;

a plurality of filters, each filter configured to receive the output from one of the detectors and to generate from the received output at least one filtered signal relating to a vibration of the corresponding region of the target object; and

a processing module configured to generate from each of the filtered light signals a processed output representing the vibration relating to the corresponding region.

Claim 2 (Previously Amended). The system of claim 1, wherein the light signal relates to an oscillation of the target object.

Claim 3 (Previously Amended). The system of claim 1, wherein the light signal relates to a transient pulse of the target object.

Claim 4 (Original). The system of claim 1, wherein at least a portion of the received signals include electromagnetic radiation reflected from the corresponding regions of the target object.

Claim 5 (Original). The system of claim 4, wherein the reflected radiation includes visible radiation.

Claim 6 (Original). The system of claim 4, wherein the reflected radiation includes infrared radiation.

Claim 7 (Original). The system of claim 4, wherein the reflected radiation includes ultraviolet radiation.

Claim 8 (Original). The system of claim 1, wherein at least a portion of the received signals include electromagnetic radiation emitted from the corresponding regions of the target object.

Claim 9 (Original). The system of claim 8, wherein the emitted radiation includes thermal IR radiation.

Claim 10 (Original). The system of claim 8, wherein the emitted radiation includes fluorescent radiation.

Claim 11 (Original). The system of claim 1, wherein the filters are configured to AC couple the outputs to generate filtered signals from which DC components have been at least partly removed.

Claim 12 (Original). The system of claim 1, wherein the processing module is configured to generate frequency information for each of the filtered signals.

Claim 13 (Original). The system of claim 12, wherein the processing module is configured to generate, for each filtered signal, a contrast signal representing a contrast attribute of the corresponding filtered signal.

Claim 14 (Original). The system of claim 13, wherein the processing module is configured to correlate the contrast attributes with the frequency information.

Claim 15 (Original). The system of claim 14, wherein the processing module is configured to generate an output representing a plot of contrast distribution across the array of detectors, the contrast distribution being associated with a given frequency.

Claim 16 (Original). The system of claim 1, wherein the detectors are configured to sample received signals at a predetermined rate.

Claim 17 (Currently Amended). The system of claim ~~15~~16, wherein the predetermined rate is fixed.

Claim 18 (Currently Amended). The system of claim ~~15~~16, wherein the predetermined rate is variable.

Claim 19 (Original). The system of claim 15, wherein the processing module is configured to generate the processed outputs at predetermined regular time intervals, the time intervals being of a length that is greater than a time interval corresponding to the predetermined sampling rate.

Claim 20 (Original). The system of claim 4, wherein at least a portion of the reflected signals are due to naturally occurring ambient electromagnetic radiation.

Claim 21 (Original). The system of claim 4, wherein at least a portion of the reflected signals are due to artificially generated electromagnetic radiation directed at the target object.

Claim 22 (Original). The system of claim 4, wherein the reflected electromagnetic radiation is at least in part from a collimated radiation source.

Claim 23 (Original). The system of claim 4, wherein the reflected electromagnetic radiation is at least in part from a coherent radiation source.

Claim 24 (Original). The system of claim 1, further including an apparatus configured to induce vibrations in the target object.

Claim 25 (Original). The system of claim 1, wherein the detectors comprise photodiodes.

Claim 26 (Original). The system of claim 1, wherein the detectors comprise CMOS detectors.

Claim 27 (Original). The system of claim 1, including an optical filter positioned between the array of the detectors and the target object.

Claim 28 (Original). The system of claim 1, wherein the processing module is configured to generate a contrast signal corresponding to the vibration of each corresponding region.

Claim 29 (Original). The system of claim 28, further including a visual output device coupled to the processing module and configured to generate a representation of the target object superimposed with the contrast signals correlated with their respective corresponding regions.

Claim 30 (Original). The system of claim 1, wherein the processing module is configured to generate a temporal spectral signal corresponding to the vibration of each corresponding region.

Claim 31 (Original). The system of claim 28, further including a visual output device coupled to the processing module and configured to generate a representation of the target object superimposed with the spectral signals correlated with their respective corresponding regions.

Claim 32 (Previously Amended). A method for detecting light signals relating to a target object, including the steps of:

receiving a light signal from each of a plurality of regions of the target object at a corresponding plurality of light amplitude modulation detectors;

generating from each received signal a signal that is correlated to a vibration of the corresponding region;
digitizing each correlated signal;
generating from the digitized signals an output representing the vibrations of the regions of the target object.

Claim 33 (Previously Amended). The method of claim 32, further including the step of executing a Fourier transform on the digitized signals.

Claim 34 (Previously Amended). The method of claim 32, wherein the plurality of detectors are arranged in a rectangular array.

Claim 35 (Previously Amended). The method of claim 32 wherein the light signals include modulated light reflected from the target object.

Claim 36 (Previously Amended). The method of claim 35, wherein the reflected light includes light having a frequency in at least one frequency range of visible, infrared and ultraviolet radiation.

Claim 37 (Previously Amended). The method of claim 32, wherein the light signals include modulated light emitted from the target object.

Claim 38 (Previously Amended). The method of claim 37, wherein the emitted light includes thermal infrared radiation.

Claim 39 (Previously Amended). The method of claim 37, wherein the emitted light includes fluorescent radiation.

Claim 40 (Previously Amended). The method of claim 32, further including the step of optically filtering the signals received from the plurality of regions.

Claim 41 (Previously Amended). The method of claim 32, further including the step of generating contrast signals from the received signals relating to the vibrations of the corresponding regions.

Claim 42 (Previously Amended). The method of claim 32, further including the step of displaying a representation of the target object visually correlated with the generated signals representing the vibrations of the corresponding regions.

Claim 43 (Previously Amended). The method of claim 32, wherein the generating step includes the step of generating a temporal spectral signal corresponding to the vibration of each corresponding region.

Claim 44 (Previously Amended). The method of claim 32, further including the step of extracting from the received signals a representation of an oscillation of the corresponding regions.

Claim 45 (Previously Amended). The method of claim 47, wherein the extracting step includes the step of AC-coupling the received signals.

Claim 46 (Previously Amended). The method of claim 45, wherein the extracting step includes the step of removing from the received signals at least one component representing ambient radiation in a vicinity of the target object.

Claim 47 (Previously Amended). A system for acoustically imaging a target object undergoing vibration, including:
an array of photodetectors;

a lens positioned to focus light signals received from individual regions of the target object onto the photodetectors, the light signals being modulated in a manner corresponding to vibrations of the individual regions;

a circuit coupled to each photodetector configured to isolate vibration signals from the light signals;

digitizing logic configured to digitize the vibration signals;

transform logic configured to extract frequency information from the digitized vibration signals; and

imaging logic configured to correlate the extracted frequency information with the corresponding regions of the target object, the correlated frequency information representing an acoustic image of the target region.